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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,194	06/22/2005	Minoru Takashima	JFE-05-1124	1226

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EXAMINER	
SHEEHAN, JOHN P	

ART UNIT	PAPER NUMBER
1793	

MAIL DATE	DELIVERY MODE
01/04/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/537,194	TAKASHIMA ET AL.	
	Examiner	Art Unit	
	John P. Sheehan	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-15 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) 1-15 are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1, 4, and 5 (as claim 5 depends from claims 1 and 4), drawn to a non-oriented electrical steel sheet comprising: on a mass percent basis, C: 0.02% or less (including 0%); Si: 4.5% or less; Mn: 3% or less; Al: 3% or less; P: 0.5% or less (including 0%); Ni: 5% or less (including 0%); and Cu: 0.2% to 4%, wherein the yield stress is not less than CYS (MPa) represented by the following formula: CYS =180+5,600[%C]+95[%Si]+50[%Mn]+37[%Al]+435[%P]+25[%Ni]+ $22d^{-1/2}$ where d is an average grain diameter (mm) of crystal grains.

Group II, claim(s) 2 and 5 (as claim 5 depends from claim 2), drawn to a non-oriented electrical steel sheet comprising: on a mass percent basis, C: 0.02% or less (including 0%); Si: 4.5% or less; Mn: 3% or less; Al: 3% or less; P: 0.5% or less (including 0%); Ni: 5% or less (including 0%); and Cu: 0.2% to 4% wherein a volume ratio of Cu precipitates in crystal grain interior is in the range of from 0.2% to 2%, and an average particle size of the Cu precipitates is in the range of from 1 to 20 nm.

Group III, claim(s) 3 and 5 (as claim 5 depends from claim 3), drawn to a non-oriented electrical steel sheet comprising: on amass percent basis, C: 0.02% or less (including 0%); Si: 4.5% or less; Mn: 3% or less; Al: 3% or less; P: 0.5% or less (including 0%); Ni: 5% or less (including 0%); and Cu: 0.2% to 4%, wherein the yield stress is not less than CYS (MPa) represented by the following formula, a volume ratio of Cu precipitates in crystal grain interior is in the range of from 0.2% to 2%, and an average particle size of the Cu precipitates is in the range of from 1 to 20 nm;
CYS=180+5,600[%C]+95[%Si]+50[%Mn]+37[%Al]+435[%P]+25[%Ni]+$22d^{-1/2}$
where d is an average grain diameter (mm) of the crystal grains.

Group IV, claim(s) 6, 8, 10 (as claim 10 depends from claims 6 and 8), 11, 13 and 15 (as claim 15 depends from claims 11 and 13), drawn to a method for

manufacturing a non-oriented electrical steel sheet, comprising the steps of: performing hot rolling of a steel slab containing on a mass percent basis, C: 0.02% or less (including 0%); Si: 4.5% or less; Mn: 3% or less; Al: 3% or less; P: 0.5% or less (including 0%); Ni: less than 0.5% (including 0%); and Cu: 0.2% to 4%, then performing cold rolling or warm rolling to obtain a rolled steel sheet having a final sheet thickness, then performing finish annealing in which heating is performed to a Cu solid solution temperature + 10°C or more, followed by cooling in which a cooling rate in a temperature range of from the Cu solid solution temperature to 400°C is 10°C/s or more.

Group V, claim(s) 7, 9, 10 (as claim 10 depends from claims 7 and 9), 12, 14 and 15 (as claim 15 depends from claims 12 and 14) drawn to a method for manufacturing a non-oriented electrical steel sheet, comprising the steps of: performing hot rolling of a steel slab containing on a mass percent basis, C: 0.02% or less (including 0%); Si: 4.5% or less; Mn: 3% or less; Al: 3% or less; P: 0.5% or less (including 0%); Ni: less than 0.5% (including 0%); and Cu: 0.2% to 4%, then performing cold rolling or warm rolling to obtain a rolled steel sheet having a final sheet thickness, then performing finish annealing in which heating is performed to Ts represented by the following formula 2 + 10°C or more, followed by cooling in which a cooling rate in a temperature range of from Ts to 400°C is 10°C/s or more; and subsequently performing aging treatment at a temperature in the range of from 400 to 650°C; Ts (°C)=3,351/(3.279-iog$_{10}$[%C])-273.

2. The inventions listed as Groups I to V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: All of the above listed groups are directed to a non-oriented electrical steel sheet or a method of making a non-oriented electrical steel sheet but each group has a different special technical feature not shared by the remaining groups.

I. Group I is directed to a non-oriented electrical steel sheet which has the special technical feature of having a yield stress is not less than CYS (MPa) represented by the following formula:

CYS =180+5,600[%C]+95[%Si]+50[%Mn]+37[%Al]+435[%P]+25[%Ni]+ $22d^{-1/2}$ where d is an average grain diameter (mm) of crystal grains.

II. Group II is directed to a non-oriented electrical steel sheet which has the special technical feature of having a volume ratio of Cu precipitates in crystal grain interior is in the range of from 0.2% to 2%, and an average particle size of the Cu precipitates is in the range of from 1 to 20 nm.

III. Group III is directed to a non-oriented electrical steel sheet which has the special technical feature of having a yield stress of not less than CYS (MPa) represented by the following formula, a volume ratio of Cu precipitates in crystal grain interior is in the range of from 0.2% to 2%, and an average particle size of the Cu precipitates is in the range of from 1 to 20 nm;

$CYS=180+5,600[\%C]+95[\%Si]+50[\%Mn]+37[\%Al]+435[\%P]+25[\%Ni]+22d^{-1/2}$

where d is an average grain diameter (mm) of the crystal grains.

IV. Group IV is directed to a method for manufacturing a non-oriented electrical steel sheet which has the special technical feature of, hot rolling a steel slab, cold rolling or warm rolling to obtain a rolled steel sheet having a final sheet thickness, then performing finish annealing in which heating is performed to a Cu solid solution temperature + 10°C or more, followed by cooling in which a cooling rate in a temperature range of from the Cu solid solution temperature to 400°C is 10°C/s or more.

V. Group V is directed to a method for manufacturing a non-oriented electrical steel sheet, which has the special technical feature of hot rolling a steel slab, cold rolling or warm rolling to obtain a rolled steel sheet having a final sheet thickness,

then performing finish annealing in which heating is performed to Ts represented by; Ts (°C)=3,351/(3.279-iog$_{10}$[%C])-273 + 10°C or more, followed by cooling in which a cooling rate in a temperature range of from Ts to 400°C is 10°C/s or more.

3. Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

4. The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

5. Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C.103(a) of the other invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim

remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John P. Sheehan whose telephone number is (571) 272-1249. The examiner can normally be reached on T-F (7:30-5:00) Second Monday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

John P. Sheehan
Primary Examiner
Art Unit 1793

JPS